

Appl. No. 09/887,569
Response dated
Reply to Final Office Action of August 12, 2003

Remarks

By the present amendment, claim 17 has been amended to specify that (a) the somatotropin is prepared as a fusion protein, (b) the nucleic acid sequence encoding somatotropin is stably integrated into the genome of the plant and (c) the somatotropin accumulates as a fusion protein in the plant seed. Support for (a) can be found in previous claim 18 which has been deleted. Support for (b) can be found on page 7, lines 23-24 and page 8, lines 23-25. Support for (c) can be found on page 15, lines 20-26 and in Figure 2. Claims 23, 24 and 25 have been amended to depend from claim 17. A new claim 30 has been added which has support in claim 25. The amendment has been made without prejudice and without acquiescing to any of the Examiner's objections. Applicants reserve the right to pursue any of the deleted subject matter in a further divisional, continuation or continuation-in-part application. The amendment does not contain new matter and its entry is respectfully requested.

The office action dated August 12, 2003 has been carefully considered. It is believed that the following comments and amendments represent a complete response to the Examiner's objections and place the present application in condition for allowance. Reconsideration is respectfully requested.

35 USC §102

The Examiner has maintained his objection to claims 17, 20 and 25 as being anticipated by Ledoux (EP 241,963), and claims 17-18, 20 and 23-24 as being anticipated by Upjohn (WO 91/13993) under 35 USC §102(b). We respectfully disagree with the Examiner for the reasons that follow.

The present applicant was the first to achieve the expression of recombinant somatotropin in seed. Applicant prepared somatotropin as a fusion protein that allowed the expression and accumulation of the somatotropin in seed. Prior to the present invention, the prior art expressed a desire to achieve the expression of somatotropin in

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seed although no one was successful in achieving that result. The references cited by the Examiner, Ledoux and Upjohn, are examples of prior references that state the desirability of expressing somatotropin in seed. However, neither of the references provides an enabling disclosure that would allow one of skill in the art to express somatotropin in seed.

There have been numerous decisions wherein the courts have held that in order for a reference to destroy the novelty of a patent application it must provide full details to place the public in possession of the invention. In this regard, we refer to *In Re Wiggins*, 488 F.2d 538. The application related to compounds useful for treating Parkinson's disease. During prosecution the Examiner cited a prior art reference that mentioned by name two compounds that fell within the scope of applicant's claims. However, the prior art reference did not make the compounds and did "not disclose all that is necessary to put the compounds in the hands of the public" (p. 542 of *In Re Wiggins*). The Patent Appeal Board held that "the mere naming of a compound in a reference, without more, cannot constitute a description of the compound, particularly when, as in this case, the evidence of record suggests that a method suitable for its preparation was not developed until a later date than that of the reference".

Another case in point is *In Re Sheppard*, 339 F.2d 238. In that case, a prior art reference suggested that a compound may have been formed although it believed that the compound was quickly decomposed and they could not verify its existence. In contrast, the patent applicant had successfully prepared the compound in a stable manner. The Patent Appeal Board held that the prior reference was not enabling and did not place the invention in the possession of the public. Therefore, there is clear case law that supports the applicant's position that the mere reference to the preparation of somatotropin without providing an enabling disclosure of how to do so is not sufficient to place the invention in the possession of the public.

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With respect to the Ledoux reference, Ledoux suggests the expression of somatotropin in plants but does not actually demonstrate somatotropin expression and does not provide an enabling disclosure on how to do so. In particular, Ledoux suggests a method involving soaking seeds, spores or embryos in a solution containing a bacterial plasmid containing the somatotropin gene. In order to clearly distinguish the present invention from Ledoux, claim 17 has been amended to specify that the nucleic acid sequence encoding somatotropin is stably integrated into the plant's genome. The method of the present invention involves introducing into a plant cell a nucleic acid sequence encoding somatotropin using plant transformation protocols that would result in stable integration in the genome of the plant. The application provides clear guidance as to appropriate methods that can be used in this regard, for example on pages 8-12.

Upjohn suggests the expression of somatotropin in seed but also does not demonstrate that they were able to produce significant levels of somatotropin in seed. Upjohn describes preparing somatotropin as a fusion with a seed storage signal peptide which is cleaved soon after expression. In this regard, we refer to page 20, lines 11-16 of Upjohn:

"The polypeptide resulting from expression from these fused gene is expected to initially include the seed storage signal peptides, which should be removed as a result of normal proteolytic cleavage to yield a Bst polypeptide which would be identical to the naturally occurring peptide except for the presence of two to four additional amino acids at its N-terminus."

In contrast, in the present invention, somatotropin is expressed as a fusion protein that is not cleaved but rather accumulates as a fusion protein in the seed as is demonstrated in Example 1 and Figure 2. Claim 17 has been amended to reflect this aspect of the invention. Consequently, the claims as amended herewith are not anticipated by Upjohn.

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In view of the foregoing, we respectfully request that the objections to the claims under 35 USC §102(b) be withdrawn.

35 USC §103

The Examiner has objected to the claims 17-18, 20 and 23-25 under 35 USC §103(a) as being unpatentable over Upjohn (WO 91/13993) in view of Vandekerckhove et al. We respectfully disagree with the Examiner for the reasons that follow.

As stated previously, Upjohn does not disclose or even suggest the production of somatotropin as a stable fusion protein that accumulates in the seed. In fact, Upjohn teaches away from the present invention as it discloses that the fusion protein needs to be cleaved from the somatotropin. As a result, there is no motivation in Upjohn to prepare somatotropin as a fusion protein that is not automatically cleaved after expression. The deficiencies in Upjohn are not remedied by Vandekerckhove et al. Vandekerckhove is not concerned with the expression of somatotropin in seed. Therefore, at the time of the invention knowing the difficulties in expressing somatotropin in seed, one of skill in the art would not look to an unrelated reference for the possible solution to the problem.

In addition to the lack of enablement and motivation in the prior art, there are secondary considerations that are relevant to the present invention. Such secondary considerations include long-felt need in the art and failure of others. The long-felt need in the art is evidenced by the Ledoux and Upjohn references cited by the Examiner. The failure of others is evidenced by the Bosch et al. reference previously submitted by the Applicant. The courts have long recognized that secondary considerations are relevant and must be considered when assessing obviousness. Therefore, we respectfully request that the Examiner gives due weight to these secondary

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considerations and the overall state of the art in regard to the production of somatotropin in seed at the time of the invention.

In view of the foregoing, we respectfully request that the objections to the claims under 35 USC §103(a) be withdrawn.

The Commissioner is hereby authorized to charge any fee (including any claim fee) which may be required to our Deposit Account No. 02-2095.

In view of the foregoing comments, we respectfully submit that the application is in order for allowance and early indication of that effect is respectfully requested. The Examiner is kindly requested to contact the undersigned by telephone at (416) 957-1682 at his convenience should there be any issues to discuss.

Respectfully submitted,

Maurice M. Moloney et al.



Micheline Gravelle
Registration No. 40,261

Bereskin & Parr
Box 401, 40 King Street West
Toronto, Ontario, Canada M5H 3Y2

(416) 957-1682

Attachments